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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/616,457
Filing Date: July 09, 2003
Appellant(s): HERRMANN, MANFRED

Cary W. Brooks
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 25,2007, appealing from the Office action mailed April 23, 2007.

(1) Real party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

Examiner is unaware of any related appeals or interference which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection in the brief is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

Number	Name	Date
US 5,595,832	Tomimatsu et al.	January 21, 1997
US 5,763,113	Meltser et al.	June 9, 1998
US 6,492,043 B1	Knights et al.	December 10, 2002
US 6,635,370 B2	Condit et al.	October 21, 2003
US 6,638,650 B1	Bailey et al.	October 28, 2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

Claims 1-3, 10, 13-14 and 46-48 stand rejected under 35 U.S.C. 102(e) as being anticipated by Condit et al. (US 6,635,370 B2).

With regard to Claims 1 and 46, Condit et al. discloses in Figure 1, a method for the investigation of a fuel cell system, said fuel cell system (100) having an anode (104) side to which a fuel is supplied in operation and a cathode side (106) to which an oxidizing agent is supplied in operation and comprising at least one fuel cell (102), each

fuel cell having an anode, a cathode and a membrane (108) separating said cathode from said anode. The method is adapted to carry out a first test comprising testing an operation of said fuel cell system at a low current yield or a shut-down procedure. The first test is carried out with a mixture of at least one inert gas with at least fuel permissible for the operation of said fuel cell system, said mixture being supplied to said anode side of said fuel cell system. The amount of fuel in the mixture is predetermined such that a proportion of said fuel in said mixture lies below the value at which mixture is flammable in air (column 1, lines 54-60). The tests are conducted in an ambient fuel cell environment, thus outside of a test chamber.

With regard to Claims 2 and 3, Condit et al. discloses that the mixture includes at least 0.00001% hydrogen and the balance being inert gas, preferably nitrogen (column 1, lines 55-58). Condit et al. also discloses that a practical upper limit is 10% hydrogen and it is preferred to maintain a hydrogen concentration of 4% or less (column 3, lines 6-24).

With regard to Claim 10, Condit et al. discloses a plurality of fuel cells combined together to form said fuel cell system in the form of a fuel cell stack and testing the operation of said fuel cell system at a low current yield or during the shut-down procedure, and carried out at said fuel cell stack (column 5, lines 12-14).

With regard to Claims 13-14, Condit et al. discloses the fuel cell system comprises at least first and second inlets (124, 130) and at least first and second outlets (126, 132), as well as a plurality of valves which are regulatable (139a, 141a, 158, 162) and associated with each said inlet and outlet, there being lines communicating with

said valves (139, 141, 160, 164). A quantity of mixture is fed into the fuel cell system, quantity is measured and valves are switched on and off in accordance with at least one of a predetermined pattern and a predetermined sequence. A measurement is made of a quantity of said mixture emerging from at least some of said lines, a sum is formed of emerging quantities and is compared with fed-in quantity to determine leakages (column 8, lines 26-40).

With regard to Claims 47-48, Condit et al. discloses in Figure 1, a method for the investigation of a fuel cell system, said fuel cell system (100) having an anode (104) side to which a fuel is supplied in operation and a cathode side (106) to which an oxidizing agent is supplied in operation and comprising at least one fuel cell (102), each fuel cell having an anode, a cathode and a membrane (108) separating said cathode from said anode. The method is adapted to carry out a first test comprising the test of testing an operation of said fuel cell system at a low current yield or a shut-down procedure. The first test is carried out with a mixture of at least one inert gas with at least fuel permissible for the operation of said fuel cell system, said mixture being supplied to said anode side of said fuel cell system and the amount of fuel in the mixture being predetermined such that a proportion of said fuel present in said mixture lies below a value at which mixture is flammable in air (column 1, lines 54-60). The tests are conducted outside of a test chamber wherein the mixture comprises at least 0.00001% hydrogen and the balance being inert gas, preferably nitrogen (column 1 lines 55-58), and more preferably a hydrogen concentration of 4% or less (column 3 lines 6-24) which is considered close to being substantially 5% fuel and 95% inert gas.

Condit et al., does not specifically point out that the test are conducted outside of a test chamber, however, it is the position of the examiner that a reference that is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *See MPEP 2112.* The tests are carried out in a fuel cell, as noted.

Claims 1, 7-8, 10, 22-25 and 44-46 stand rejected under 35 U.S.C. 102(e) as being anticipated by Bailey et al. (US 6,638,650 B1).

With regard to Claims 1, 10 and 46, Bailey et al. discloses in Figures 1 and 2, a method for the investigation of a fuel cell system, said fuel cell system (102) having an anode side to which a fuel is supplied in operation and a cathode side to which an oxidizing agent is supplied in operation and comprising at least one fuel cell (108a, 108b, 108c, 108d), each fuel cell having an anode, a cathode and a membrane (111a 110b, 110c, 110d) separating said cathode from said anode. The method is adapted to carry out a first test of detecting transfer leaks within a plurality of fuel cells (see abstract), said first test being carried out with a mixture of at least one inert gas with at least fuel permissible for the operation of said fuel cell system, said mixture being supplied to said anode side of said fuel cell system. The amount of fuel in the mixture being predetermined such that a proportion of said fuel present in said mixture lies below a value at which mixture is flammable in air (column 1, lines 43-50), and wherein

said tests are conducted in an ambient fuel cell environment, thus outside of a test chamber.

With regard to Claims 7-8, Bailey et al. discloses in column 3, lines 22-24, the fuel cells being typically checked for leaks prior to operating the fuel cell, for example, after assembly or during routine maintenance.

With regard to Claims 22-25, Bailey et al. discloses in column 9, lines 5-15, the voltage across at least one of the fuel cells in the stack is measured. Absent a reactant transfer leak, the fuel cells in the stack will generate a constant voltage dependant upon the concentration of reactants in the fuel cell and the load. A reactant transfer leak will introduce oxidant to and result in a mixed potential at the anode, which may result in a measurable drop in cell voltage that can be detected by the voltmeter. The cell voltage of a given cell is compared to the cell voltages of other cells in the stack or a reference cell voltage. If the measured cell voltage is significantly less than the comparison cell voltage, then a reactant transfer leak is indicated.

With regard to Claims 44-45, Bailey et al. discloses the inert gas comprises nitrogen and the fuel comprises hydrogen (column 1, lines 42-48); and supplying the gases through separate gas sources having independent pressure regulation. Other arrangements are suitable (column 17, lines 18-25), such as supplying the gas mixture from a mixture tank in order to have better control over the mixture being supplied, as well as saving space in the fuel cell system.

Claim Rejections - 35 USC § 103

Claims 4-5 and 11-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey et al. (US 6,638,650 B1), as applied to Claims 1, 8, 10, 22-25 and 44-46 above, and in further view of Knights et al. (US 6,492,043 B1).

Bailey et al. discloses the method of investigation of a fuel cell system to detect a leak within the fuel cell system as noted in the previous section, but does not disclose the first test being carried out in an environment with a normal air atmosphere or an environment with normal ventilation. Bailey et al. also does not disclose the fuel cell system comprising, at least, first and second inlets and outlets, and wherein, during the first test, said mixture is filled at a predetermined test pressure into said fuel cell system through one of said inlets and outlets, with simultaneous, previous, or subsequent closing of further ones of said inlets and said outlets out of which an exit of said mixture could take place and wherein a measurement is made whether said test pressure reduces impermissibly as a function of time.

With regard to Claims 4-5, Knights et al. discloses that in order to detect external leaks between a fuel cell fluid passage and the external environment, the monitored environment may be the surrounding environment outside the cell (column 8, lines 24-26). Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to carry out tests of the Bailey et al. reference in the environment suggested by Knights et al., because Knights et al. teaches that the environment outside of the fuel cell would be in a normal air atmosphere and have proper ventilation so as not to reduce fuel cell performance and efficiency and to test for external leaks.

With regard to Claims 11 and 12, Knights et al. discloses introducing gas into the inlet of one of the fluid passages while the outlet is sealed. The other fuel cell fluid passage inlets are sealed. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to test for leaks within the fuel cell system as in the Bailey et al. reference by simultaneously, previously or subsequently closing inlets and outlets as in the Knights et al. reference, because Knights et al. teaches that isolation each of the inlets and outlets will help determine where the leak is coming from. The reference is silent as to the predetermined test pressure in comparison to the operating pressure. However, it is the position of the examiner that the criticality of the pressure during test mode and normal operation does not provide patentable distinction.

Claims 6-7, 9, 18-21, 30-32 and 46 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (US 6,635,370 B2), as applied to Claims 1-3, 10, 13-14 and 46-48 above, or over Bailey et al. (US 6,638,650 B1), as applied to Claims 1, 8, 10, 22-25 and 44-46 above.

With regard to Claims 6-7, 9 and 46, Condit et al. discloses the method of investigation for a fuel cell system above and Bailey et al. discloses the method of investigation of a fuel cell system above, but neither reference discloses at least one of said tests being carried out during or after manufacture of a vehicle incorporating said fuel cell system as a source of propulsion in order to test operability of said vehicle at a time of manufacture, wherein the first test is carried out in a workshop after repair of a vehicle containing said fuel cell system, wherein at least one of the tests is carried out

on a test bed during development of said fuel cell system and the test is carried out without a test chamber. It would have been obvious to a person of ordinary skill in the art to perform these method steps in any order since it is known in the art that the selection in which the process steps are carried out is given no patentable weight when not distinctly claimed. See MPEP 2144.

With regard to Claims 18-21, Condit et al. discloses the method of investigation for a fuel cell system above and Bailey et al. discloses the method of investigation of a fuel cell system above, but neither reference discloses the method in which at least one of the tests is carried out as a long term test, including a plurality of switching on or switching off processes of said valves, further including at lest one regulating valve having at least one set value, wherein said long-term test also includes changes of said set value, and also including a plurality of heating up and cooling down cycles of said fuel cell system. It would have been obvious to a person of ordinary skill in the art to perform these method steps as long term tests so as to be able to monitor, measure and evaluate the severity of the leakage, identify small leaks which may not show up during one test run and/or to narrow down the specific cell in which leakage is occurring.

With regard to Claims 30-32, Condit et al. discloses the method of investigation for a fuel cell system above and Bailey et al. discloses the method of investigation of a fuel cell system above, but neither reference discloses after successfully concluded tests occurs, a second test is carried out in the same manner as the first test. It would have been obvious to one of ordinary skill in the art to perform a second test in the same manner as the first test, by using a different amount of gas mixture being fed into

the fuel cell system to determine a different power yield of the system, in order to determine of the results of the first and second tests are similar or accurate.

Claim 15 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (US 6,635,370 B2), as applied to Claims 1-3, 10, 13-14 and 46-48 above, and in further view of Bailey et al. (US 6,638,650 B1).

Condit et al. discloses the method investigation for a fuel cell system as previously noted, but does not disclose wherein a development in time of said difference value is compared with a said predetermined pattern in order to associate any eventually present leakage source or a plurality of leakage sources.

Bailey et al. discloses the fuel cell system comprising first and second inlets (136, 126) and a plurality of valves which are regulatable (column 9, lines 2-3), at least one of which is associated with each said inlet and outlet. Bailey et al. does not disclose lines communicating with said valves and a quantity of said mixture is fed into the fuel cell system, the quantity being measured and valves being switched on and off in accordance with at least one of a predetermined pattern and a predetermined sequence. Bailey et al. also does not disclose a measurement taken from a quantity of said mixture emerging from at least some of said lines, a sum being formed of emerging quantities and compared with a fed-in quantity to determine leakages (column 9, lines 10-15 and 24-33). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to compare a time difference with a predetermined pattern

in order to identify leakage in the Condit et al. fuel cell system, because Bailey et al. teaches preventing degradation of the fuel cell system when leakage occurs.

Claims 16-17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (US 6,635,370 B2), as applied to Claims 1-3, 10, 13-14 and 46-48 above, or over Bailey et al. (US 6,638,650 B1), as applied to Claims 1, 8, 10, 22-25 and 44-46 above, and in further view of Tomimatsu et al. (US 5,595,832).

Condit et al. discloses the method of investigation for a fuel cell system above and Bailey et al. discloses the method of investigation of a fuel cell system above, but neither reference discloses expressly wherein said fuel cell system is heated to one of an operating temperature and an excess temperature prior to and during the carrying out of any one of said tests.

Tomimatsu et al. discloses, the fuel cell being heated to an operating temperature (column 8, lines 55-56) and under a high temperature (column 11, line 16) prior to testing for a gas-crossleak amount at the exhaust output of the cathode (column 22, lines 20-30). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to heat the fuel cell of Condit et al. or Bailey et al. to an operating temperature and a higher temperature prior to and during the carrying out of any of the tests, because Tomimatsu et al. teaches the method of making sure that the fuel cell operates at a maximum temperature and is fully functional before an investigative test is performed.

Claim 33 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (US 6,635,370 B2), as applied to Claims 1-3, 10, 13-14, and 46-48 above, and in further view of Meltser et al. (US 5,763,113).

Condit et al. discloses the method of investigation for a fuel cell system above, but does not disclose expressly wherein at least one of a fuel sensor and an inert gas sensor is used in order to determine any leakages of said mixture.

Meltser et al. discloses in column 4, lines 49-52, as part of the hydrogen leakage alert system, that a hydrogen sensor communicates with the cathode exhaust gas manifold for measuring hydrogen concentration therein. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a hydrogen sensor as taught in the Meltser et al. reference as part of the fuel cell system of Condit et al., because Meltser et al. teaches monitoring the amount of hydrogen seepage through the membrane into the cathode flow channel so as to catch the problem of leakage before it causes inefficiency in the fuel cell operation (column 4, lines 33-38).

(10) Response to Arguments

A fuel cell is a battery that uses a gaseous fuel as a power source. The fuel is catalyzed at the anode to give a useable electron and travels through a circuit to power an electrical device. The fuel used in a fuel cell is generally hydrogen, which is a highly combustible gas. Thus, the fuel cell powers electrical devices, such as computers and automobiles, using a renewable fuel.

Appellants invention is to a method wherein a mixture of fuel and an inert gas are used to lower the concentration of the fuel to a level that is not combustible. The method is intended to test leakage of a gas from a fuel cell, test the starting behavior of the fuel cell system or to test an operation of the fuel cell system at a low current yield.

Independent Claims 1 and 47, claim that the method takes place in a fuel cell using a mixture of fuel and an inert gas. The mixture is combined in proportions so as not be flammable in air, said mixture being supplied to the anode side of the fuel cell system. The prior art references teach each of the claimed features. However, Appellant argues that the tests are not conducted outside of a test chamber. The tests of the applied references are conducted outside of a test chamber as they are done in a fuel cell.

Rejection of Claims 1-3, 10, 13-14 and 46-48 under 35 U.S.C. 102(e) as being anticipated by Condit et al (U.S. Patent No. 6,635,370).

Appellant argues that Examiner completely ignores the limitation "and wherein said tests are conducted outside of a test chamber". These limitations have not been ignored by Examiner as they have been addressed in each rejection of record. Appellant argues in response to the rejection wherein in the Office Action dated January 26, 2007, Examiner states:

> Condit et al, do not specifically point out that the tests are conducted outside of a test chamber, however, it is the Examiner's position that a reference that is silent about a claimed invention's features is inherently anticipated if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. MPEP 2112

Therefore, the Examiner has not ignored this limitation because the Examiner has stated in the rejection that the limitation is inherently anticipated because the test occurs in a fuel cell. Examiner also addresses the limitation by showing that Condit et al. discloses that the test being conducted occurs at the anode side of the fuel cell system (column 8, lines 30-39). The anode side of the fuel cell is an ambient fuel cell environment.

With respect to Claim 3, Appellant argues that Condit et al. does not teach a mixture comprising "substantially 95% nitrogen and 5% hydrogen". Condit et al. teaches, for an anode fuel, using 10% hydrogen concentration as a practical upper limit, the balance being inert gas, preferably nitrogen. Condit et al. also teaches that a concentration of 4% hydrogen with a remaining balance of the mixture being inert gas, preferably nitrogen, is preferred. The range of 4% to 10% encompasses Appellant's claimed "substantially 5% hydrogen". Because Condit et al. discloses less than 4% being a preferred value, it is not the only value, or an exact value, for that matter, and is considered an ample or considerable amount, the definition of what it is to have a substantial amount.

With respect to Claims 13-14, once again Appellant argues that Examiner has "ignored" the claim limitation that "a measurement is made of a quantity of said mixture emerging from at least some of the lines, a sum is formed of the emerging quantities and is compared with fed-in quantities to determine leakage". Examiner cited, in office action dated April 23, 2007, that Condit et al. disclose in column 8, lines 22-39, a test for

measuring the hydrogen concentration present during storage because during storage hydrogen may leak out of the system. The hydrogen concentration within the anode flow field is monitored with a hydrogen sensor and more hydrogen or hydrogen rich fuel is added into the system in order to maintain a desired range of hydrogen. This test is conducive with measuring for leaks, because if there is no change in the hydrogen concentration within the anode flow field, no leakage has occurred.

Rejection of Claims 1, 7-8, 10, 22-25 and 44-46 under 35 U.S.C. 102(e) as being anticipated by Bailey et al (U.S. Patent No. 6,638,650).

Appellant argues that Examiner completely ignores the limitations "and wherein said tests are conducted outside of a test chamber". These limitations have not been ignored by Examiner, and it has been addressed in the Office Action dated January 26, 2007, which states that Bailey et al. discloses a fuel cell system having an anode side to which a fuel is supplied in operation (column 1, lines 42-48) and absent a leak, the fuel cell stacks will generate a constant voltage dependent on the concentration of the reactants In the fuel cell system (column 9, lines 5-8). Bailey et al. discloses that a test conducted at the anode side of the fuel cell will determine if a transfer leak has occurred (column 9, lines 3-11). Because Bailey et al. discloses that the test being conducted occurs at the anode side of the fuel cell system, the anode side of the fuel cell being located in an ambient environment, which is essentially the same as that which is outside of a test chamber.

With respect to Claim 44, Appellant argues that Bailey et al. fails to disclose "supplying said mixture from a mixture tank". Bailey et al. disclose in column 1, lines 42-49, that the fuel stream supplied to the anode is a gas of pure hydrogen or a reformate stream comprising hydrogen and other fluid components including nitrogen. The fact that the fuel contains other components, such as nitrogen, makes it a mixture and the tank from which the gas is supplied is considered a mixture tank that contains a mixture of gases, for example hydrogen and nitrogen.

Rejection of Claims 4-5 and 11-12 under 35 U.S.C. 103(a) as being unpatentable over Bailey et al. (U.S. Patent No. 6,638,650) as applied to claims 1, 8, 10, 22-25 and 44-66 and further in view of Knights et al. (U.S. Patent No. 6,492,043).

Appellant argues that Knights et al. does not teach anything about the outside environment of the fuel cell. Appellant further argues that the outside environment of the fuel cell might be and can be inferred to be a testing chamber and that Knights et al. does not suggest testing a fuel cell outside of a testing chamber.

As noted in the rejection, Knights et al. discloses in column 8, lines 4-28, a method of detecting a leak within a fuel cell, one specific test being to detect external leaks by monitoring the external environment, the environment being the surrounding environment outside of the fuel cell. The outside environment is not a chamber. Knights et al. clearly teaches testing outside of a test chamber.

Appellant also makes reference to one specific embodiment, Figure 6 and column 13, lines 17-20, in which the fuel cell stack is enclosed inside of a chamber and

under vacuum. However, this is one specific embodiment of several that have been referenced for disclosing the method of testing for leaks within a fuel cell system.

With respect to Claim 11, Appellant argues that the limitations of the claim have been ignored. These limitations have not been ignored by Examiner and the rejection can be found on page 8 of the office action dated January 26, 2007.

Rejection of Claims 6-7, 9, 18-21, 30-32 and 46 under 35 U.S.C. 103(a) as being unpatentable over Condit et al, as applied to claims 1-3, 10, 13-14 and 46-48, or over Bailey et al as applied to claims 1, 8, 10, 22-25 and 44-46.

Appellant argues that the references do not disclose at least one of the tests being carried out during the manufacturing of a vehicle incorporating said fuel cell as a source of propulsion in order to test operability of said vehicle at time of manufacture, wherein the first test is carded out in a workshop after repair of a vehicle containing said fuel system or wherein at least one of the tests is carried out on a test bench during development of said fuel cell system and the test being carried out without a test chamber.

Examiner argues that these limitations have been addressed as obvious in the office action dated January 26, 2007, on page 9, paragraph 8. Conducting the tests in a specific location do not further limit the claimed invention. It would have been obvious to conduct the test where the fuel cell is located, Further, it would have been obvious to conduct the experiment before or after the assembly of a vehicle.

With respect to claim 6, Appellant argues that neither Condit et al. nor Bailey et al. disclose that the amount of fuel in the mixture supplied to the anode should be present in an amount such that the mixture lies below the value at which the mixture is flammable in air so that the tests can be conducted outside of a test chamber. The Condit et al. reference teaches a mixture that is not flammable. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With respect to Claims 30-32, Appellant argues that the Examiner has ignored the recitations "a portion of the fuel in said mixture is increased and a second test is carried out in the same manner as the first test", "said second test is carried out...with a significantly reduced portion of inert gas in the mixture" and still further, "said second test is carried out...with a degenerated mixture without inert gas."

It is noted by the Examiner, in the rejection of Claims 30-32 in the office action dated January 26, 2007, on page 10, lines 7-15, that a second test would be obvious to verify the results of the first test. The teachings of Condit et al. and Bailey et al. show different concentrations of fuel being used, which means that the amount of fuel and inert gas in the mixture is altered.

Rejection of Claim 15 under 35 U.S.C. 103(a) as being unpatentable over Condit et al, as applied to claims 1-3, 10, 13-14 and 46-48 above, and further in view of Bailey et al.

Appellant argues that although Examiner points to Bailey et al., column 9, lines 10-15 and 24-33 to support the rejection, Bailey et al. does not measure the amount of gas entering and leaving the fuel cell system.

Examiner asserts that the point being argued is not in the claim limitations for Claim 15. Claim 15 states, " wherein a development in time of said difference value is compared with said predetermined pattern in order to associate any eventually present leakage with a leakage source or a plurality of leakage sources", and does not claim the amount of gas entering and leaving the fuel cell system.

Rejection of Claims 16-17 under 35 U.S.C. 103(a) as being unpatentable over Condit et al., as applied to claims 1-3, 10, 13-14 and 46-48, or over Bailey et al., as applied to claims 1, 8, 10, 22-25 and 44-46, and further in view of Tomimatsu et al. (U.S. Patent No. 5,595,832).

Appellant argues that neither Condit et al., Bailey et al., or Tomimatsu et al. disclose or suggest that a fuel cell system should be investigated utilizing a fuel mixture including an amount of fuel below that at which the mixture is flammable in air and that the test should be conducted outside of a test chamber.

The limitation is found in the rejection of Claims 16-17 in the office action dated January 26, 2007, see paragraph 10 on pages 11 and 12.

Rejection of Claim 33 under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (U.S. 6,635,370), as applied to claims 1-3, 10 and 13-14, or over Bailey et al. (U.S. 6,638,650), as applied to claims 1, 8, 10, 13-15, 22-25 and 44-45, and further in view of Meltser et al. (U.S. 5,763,113).

Appellant argues that in column 3, line 65 to column 4, line 2, Meltser et al. teaches a cathode flow channel being provided adjacent the cathode for flowing oxygen-rich gas (i.e., preferably air) by and into contact with the cathode, and similarly an anode flow channel provided adjacent the anode for flowing hydrogen fuel by and into contact with the anode. Appellant concludes that because Meltser et al. makes a distinction with respect to the oxidant as being oxygen-rich, but no such distinction is made with respect to the hydrogen fuel, the inference a person of ordinary skill in the art would draw from the reference is that pure hydrogen is supplied to the anode. This argument is not persuasive.

Claim 33 is not to an amount or concentration of fuel. As disclosed by Condit et al., in column 3, lines 8-9, having 100% hydrogen throughout the cells would work fine, but it is difficult and costly. The Condit et al. reference teaches up to 10% hydrogen. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Therefore,

one of ordinary skill in the art would not use 100% hydrogen in the tests of the references.

(11) Related Proceedings Appendix

None.

For the above reasons, it is believed that all the rejections should be sustained.

Respectfully Submitted,

Karie O'Neill
Examiner, Art Unit 1795
Karie O'Neill 12/20/07

Mark Ruthkosky

William Krynski